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**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5**

Date: January 13, 2000

Subject: SE Rockford and Interstate Pollution Control

From: Doug Yeskis, Geologist *Doug Yeskis*
Remedial Response Section #2

To: Ken Lovelace, Ground-Water Team Leader
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The issues associated with these two sites are many and complex. Our discussion in Las Vegas during the recent Ground-Water Forum meeting just scratched the surface, and in the time that I have been back, only some of the problems have been uncovered. The following is a brief summary of the facts, as of the present time associated with these two sites and developing a comprehensive ground-water decision process for Rockford, IL.

- 1) SE Rockford had a ROD signed in 1995 for OU#2, which called for natural attenuation of multiple area-wide ground water plumes over a period of 200+ years. This time period assumes that sources will be controlled by later actions in OU3.
- 2) The Interstate Pollution Control (IPC) site is within the SE Rockford area of investigation.
- 3) SE Rockford has not had any subsequent RODs signed for source control since 1995. The IEPA is still completing work on the FS.
- 4) SE Rockford has a multiple ground-water contamination plumes from multiple contamination sources. One of these plume(s) is approximately 2 to 3 miles long.
- 5) One upgradient plume at the Interstate Pollution Control (IPC) site is the Mattison Machine Works. The IEPA has indicated that there is another plume upgradient of the Mattison Machine Works. The future of the machine works ground-water contamination problem and the additional upgradient plume is not currently being addressed by the IEPA.
- 6) There has not been an ecological assessment of the Rock River in the area of ground-water discharge from either the main SE Rockford sites or the IPC site.
- 7) The contaminant levels of the SE Rockford plume are high, with total VOC's in ground water exceeding 10,000 µg/l in several parts of the plume(s).
- 8) The high concentrations in ground water and in soils may indicate the presence of NAPL in several areas, especially source areas 4, 7, and 11 of SE Rockford site. The presence of NAPL's is unknown at the IPC site, based on the limited sampling results.
- 9) Residential vapor and blood samples were taken in October 1989 by the Illinois Department of Public Health (IDPH) for the Agency for Toxic Substances and Disease Registry (ATSDR). These homes had not been provided an alternate water supply at that time. There was direct correlation between air levels of VOC's and blood levels of VOC's. IDPH and ATSDR concluded: "It is noteworthy that most of the elevated blood

- levels were found for the same compound, cis-1,2-dichloroethylene, and the elevated level of trichloroethylene was one of the highest levels observed to date by the NCEHIC Division of Environmental Health Sciences Laboratory.”
- 10) The ATSDR added the SE Rockford site to its National TCE registry.
 - 11) Residential vapor samples were taken in residential homes, and concentrations were “qualitatively evaluated” in 1993 relative to consideration of background levels. The IEPA has said that there were problems determining background concentrations.
 - 12) The IEPA concludes that the residential vapors contained TCA, TCE and PCE, which are more likely the result of volatilization of contaminants from the subsurface soils than via the ground-water pathway.
 - 13) However, copies of the residential vapor data obtained from the Illinois Department of Public Health files in January 1999 by the ATSDR (copy attached) indicate levels of several VOC’s above USEPA ambient air quality standards. In some houses, the concentrations are significantly above the 10^{-4} cancer risk (4 homes for trichloroethene and one home for tetrachloroethene). In one of those homes, the trichloroethene concentration is above the 10^{-3} cancer risk. Note, these homes were last sampled in 1993. Also note, that the homes were not sampled for vinyl chloride.
 - 14) Our understanding is that the IEPA would like to implement source controls, and then evaluate the residential vapor problem once the source control is in place.
 - 15) Additionally, within the SE Rockford plume, a municipal well, and perhaps some residential wells, have carbon filtration to filter the contaminants prior to drinking.
 - 16) The IEPA has designated Winnebago County (where the City of Rockford is located), as a part of their Comprehensive State Ground-Water Protection Plan, as an aquifer of high priority in the State of Illinois.

Given these facts, there are four outstanding issues. The first is the ROD for the IPC site. The second is the volatilization into residential homes. The third concerns the safety of the drinking water. The final issue concerns the overall coordination within the area designated as the SE Rockford site and the impacts on the state designation as a high priority aquifer.

IPC Site

Plumes from some of the identified SE Rockford plumes (as identified in the 1995 ROD) are not likely to co-mingle with the IPC plume. However, a plume from Mattison Machine Works is expected to reach the IPC site within about 15-45 years. In addition, work on the Mattison Machine Works site indicates there is another plume upgradient of that site. A key issue is whether any of these plumes will reach the Rock River? If so, will the plume(s) impact the ecological system, especially the benthic organisms? Is there a potential for migration under the Rock River? For example, this could result from additional pumping centers on the west side of the Rock River. One study completed in 1989 by the Illinois State Water Survey (ISWS) indicates the Rockford Municipal Well #4 is located on the west side of the Rock River, just north of the potential discharge zone of the IPC plume. This well is located in the bedrock aquifer, which may minimize the potential impact on drawing contaminants under the Rock River.

However, my data on municipal well locations is from 1989, and the IEPA should evaluate if any new wells have been installed in this area of concern.

One issue concerning the IPC site that may also impact the SE Rockford site; as well as, the Mattison Machine Works contamination plume; concerns the total loading of VOCs to the Rock River. If any ecological assessment was completed for any one of these sites, did it address the question of what will happen to the ecological system when all three sites discharge to the Rock River in the same area?

SE Rockford Residential Vapor Issue

First, SE Rockford has multiple ground-water contamination plumes with several VOC contaminants. Several VOCs are volatile enough to migrate as soil vapor. The geology of the site is composed of a sand & gravel aquifer which overlays a fractured dolomite aquifer. The contaminant levels are quite high, with parts of the plumes having VOC's over 10,000 ppb. The compounds of concern are very volatile based on their vapor pressures and Henry's Law Constants. Depth to ground water is shallow, about 20 feet below land surface in the area. Residential homes have been sampled and been found to have VOC's present, and in some cases, significantly high levels.

Based on other site experience, VOC's can migrate into the homes via the vapor phase. Given the current lack of source control and given the lack of any active ground-water remediation, the soil vapors could pose a long-term health risk. In addition, the residents may have already been exposed to vapors for many years (ground-water contamination has been documented since the mid-1980's and has probably existed since the mid-fifties). The 1989 and 1993 vapor surveys confirmed the presence of VOC's in the homes. The 1993 survey was completed after alternate water supplies were available to residents, so the only source of the vapors would be direct migration into the homes via soil vapor.

I have recommend to regional staff in several e-mails, that a vapor survey of people's homes for this site be completed as soon as possible, especially with the up-coming heating season. This may require a more comprehensive study than IEPA completed in 1993, especially in the determination of background conditions. The goal is to determine what are people exposed to at the present time, and evaluate the potential risks based on the past exposures, and potential future exposures. Given that any source control remedies are still 1-2 years away, at the earliest, and given the probable exposure for the past 10-15 years (and probably since the 1950's, making it a 50-year exposure period), at a minimum, the quantitative assessment of this risk with the 1993 data, and possibly new data (my recommendation), should be completed.

Furthermore, if the issue is whether the residential vapors are coming from the ground water or the source areas, a soil gas survey, completed in conjunction with a residential vapor survey and ground-water sampling, could define the pathway. Clearly, the determination of potential pathways should be completed prior to selection of any remedies, as opposed to the other way

around. The determination of this pathway of contaminant migration should be completed to insure protectiveness of any ground water or source control remedy.

Safety of Drinking Water Supply

Another issue that may be of concern at the SE Rockford site involves a contaminant of concern that has probably not been scanned for, as it is not a part of the CLP or CRL routine analytical package. The compound is 1,4-dioxane. Some of the sources of the ground-water contamination in SE Rockford are the same types of sources that were disposed of at the Byron Salvage Yard. At the Byron Salvage Yard, levels of 1,4-dioxane were detected up to 68 µg/l. The current understanding of risk numbers for this compound indicate that 6.1 µg/l in a drinking water supply may pose a 10^{-6} cancer risk (USEPA-Region 3 Risk Based Concentrations, October 7, 1999). At least one municipal water supply well is within the plume area. This well has had a carbon filter installed and is currently used as a stand-by well. However, we know that 1,4-dioxane is not treated by activated carbon. Therefore, I have suggested to the region that some drinking and ground-water samples be collected for analysis of 1,4-dioxane. The analytical procedure for 1,4-dioxane is complex, is not part of the CLP analyte list, and only a few labs in the country can analyze for it. However, the USEPA clearly understands this is a compound of concern, and should be evaluated, as it is specifically mentioned in the Monitored Natural Attenuation guidance document (USEPA, April 1992). This concern, as clearly stated in the guidance, is based on the chemical characteristics of this compound and its inability to be treated by common treatment processes. The analysis for 1,4-dioxane should be completed to insure protectiveness of the chosen remedy on the existing municipal and other water systems.

Overall Coordination of Remedial Actions

Given that the State of Illinois has designated the ground water in Winnebago County as a high priority, and given the reliance of Rockford on ground water for its drinking water supply, an overall coordinated approach to the restoration of ground water should be used for the SE Rockford site. Balanced against this, of course, must be cost. It is my understanding based on a document by the ISWS and in a conversation with the IDPH, that several other municipal wells in other parts of Rockford are showing contamination. If the IEPA and the City of Rockford allow the contamination to migrate with no ground-water-containment systems, this would contaminate a substantial part of the western part of the SE Rockford area. This would effectively remove this area from further development of its ground-water resources.

Since the ground-water decision for the SE Rockford site is for natural attenuation, and the contamination plumes have not currently reached the Rock River, the ecological impact on the Rock River is specifically unknown. However, if additional ground-water plumes, beyond those currently identified in the SE Rockford area and the IPC site (such as Mattison Machine Works, People's Landfill, and the unnamed plume upgradient from the IPC site) discharge into the Rock River, what impact would those additional plume(s) have on the Rock River ecological system. In other words, the potential ecological impacts may be minimal under the original SE Rockford

plumes, but if additional plumes discharge into the Rock River, an ecological risk may be present. Given this possibility, what ground-water plumes would be treated and what plumes would be allowed to continue to discharge into the Rock River?

Also, what will be done with some of the orphan sites, such as Mattison Machine Works, Peoples Landfill, the upgradient ground-water contamination source of Mattison Machine Works, etc. Will these site be treated consistent with the other SE Rockford plumes? Will any source control remedies be implemented for these other sources? These types of sites do not appear to be covered by the current remedial plan, but clearly impact the overall water quality in SE Rockford and are within the boundaries of the current site investigation.

Given that the SE Rockford site is in a high-priority aquifer as designate by the IEPA, are the remedies selected or currently proposed for SE Rockford and IPC consistent? The USEPA ground-water policy is to restore ground water to its beneficial use in a reasonable timeframe consistent with the "particular circumstances of the site". Also given that most of the aquifer underlying the site is a sand and gravel aquifer, it would certainly be practical to pump and treat. At a minimum, the ground-water contamination plumes could be contained to prevent further migration of the contaminants.

I hope this memo successfully summarizes the issues associated with the Southeast Rockford area successfully. If you have any questions, please feel free to call me at 312-886-0408.

cc: Russ Hart, SR-6J
Terese van Donsel, SR-6J
Bruce Sypniewski, SR-6J

Attachment